



## **DEPARTMENT OF LABOR**

### **Occupational Safety and Health Administration**

**[Docket No. OSHA-2014-0022]**

#### **Nucor Steel Connecticut Incorporated; Grant of a Permanent Variance**

**AGENCY:** Occupational Safety and Health Administration (OSHA), Labor.

**ACTION:** Notice.

**SUMMARY:** In this notice, OSHA grants a permanent variance to Nucor Steel Connecticut Incorporated from the provisions of OSHA standards that regulate the control of hazardous energy (lockout/tagout).

**DATES:** The permanent variance specified by this notice, becomes effective on [INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER] and shall remain in effect until it is modified or revoked.

**FOR FURTHER INFORMATION CONTACT:** Information regarding this notice is available from the following sources:

Press inquiries: Contact Mr. Frank Meilinger, Director, OSHA Office of Communications, U.S. Department of Labor, 200 Constitution Avenue, NW., Room N-3647, Washington, DC 20210; telephone: (202) 693-1999; email: [meilinger.francis2@dol.gov](mailto:meilinger.francis2@dol.gov).

General and technical information: Contact Mr. Kevin Robinson, Director, Office of Technical Programs and Coordination Activities, Directorate of Technical Support and Emergency Management, Occupational Safety and Health Administration, U.S. Department of Labor, 200 Constitution Avenue, NW., Room N-3655, Washington, DC 20210; phone: (202) 693-2110 or email: [robinson.kevin@dol.gov](mailto:robinson.kevin@dol.gov).

## **SUPPLEMENTARY INFORMATION:**

Copies of this Federal Register notice.

Electronic copies of this Federal Register notice are available at <http://www.regulations.gov>. This Federal Register notice, as well as news releases and other relevant information, also are available at OSHA's webpage at <http://www.osha.gov>.

### **I. Notice of Application**

On September 22, 2014, Nucor Steel Connecticut Incorporated (hereafter, "NSCI" or "the applicant") 35 Toelles Road, Wallingford, CT 06492, submitted under Section 6(d) of the Occupational Safety and Health Act of 1970 ("OSH Act"; 29 U.S.C. 655) and 29 CFR 1905.11 ("Variances and other relief under section 6(d)") an application for a permanent variance from several provisions of the OSHA standard that regulates the control of hazardous energy ("lockout/tagout" or "LOTO"), as well as a request for an interim order pending OSHA's decision on the application for variance (Ex. OSHA-2014-0022-0003) at its Wallingford, CT facility. Specifically, NSCI was seeking a variance from the provisions of the standard that require: (1) Lockout or tagout devices be affixed to each energy isolating device by authorized employees (29 CFR 1910.147(d)(4)(i)); and (2) lockout devices, where used, be affixed in a manner that holds the energy isolating devices in a "safe" or "off" position (29 CFR 1910.147(d)(4)(ii)). Also, NSCI requested an interim order pending OSHA's decision on the application for variance.

According to its application, NSCI manufactures steel wire rod and coiled rebar from billets of steel by using rolling and forming processes. Further, NSCI's description of its

operation indicated that the hot steel billets are shaped and formed into steel wire rod and coiled rebar by running them through a series of rolls. The rolls shape and form the steel as it moves from one stand to the next. Each roll has several passes (or grooves), only one of which is used at a time. The pass is designed to shape the bar to a certain size as it goes through the mill by compressing, squeezing, and stretching the bar. Rolls are designed with passes to bring a bar down through roughing, intermediate and finish mills to a finished size.

As with any shaping tool, the passes wear during use and from time to time need to be changed. As the pass wears, the shape of the bar and the appearance of the bar are affected. When new rolls are brought into production, every pass is prepared with a spray that provides friction which allows the rolls to bite the bar between the rolls. Once rolls are in operation, roll grinding is regularly required, because during the operation of the mill stands water is used to cool the rolls to prevent fracturing and damage to the rolls. The water protects the pass while in use, but it also creates rust in the other passes. The rust can affect the final quality of the bar being processed, so steps are taken to remove the rust prior to restarting the operations. Rust is removed from the passes using a common 4-inch hand grinder. Since January 2012, the rolls have been ground with the rolls stopped and locked out.

NSCI asserted that grinding the rolls requires access to the Motor Control Room (MCR), in order to operate the energy isolation disconnects for the roll mills.

Employees who perform the particular task of grinding the passes are exposed to potentially serious arc flash hazards if they accessed the MCR in order to perform energy isolation functions. To control exposure to the arc flash hazards, NSCI instituted safe

work rules that: (1) designate the MCR as a restricted entry work area; (2) restrict MCR access to qualified electricians only; and (3) prohibit employees who perform pass grinding from entering the MCR because they are not qualified electrical employees trained in recognition and mitigation of electrical hazards. Further, NSCI asserted that as a consequence of following these safe work rules the employees performing pass grinding cannot lockout the energy isolation disconnects located in the MCR or personally verify that a lockout has been performed.

OSHA initiated a technical review of NSCI's variance application and developed a set of follow-up questions regarding the assertions of equivalent worker protection included in the application. On November 26, 2014, OSHA sent NSCI a letter containing a set of follow-up questions (Ex. OSHA-2014-0022-0006). On December 19, 2014, NSCI provided its responses to the follow-up questions (Ex. OSHA-2014-0022-0007). Based on these responses to the follow-up questions and the alternate safety measures proposed in NSCI's application, on May 22, 2015, the Agency sent NSCI a letter (Ex. OSHA-2014-0022-0009) describing its findings on the technical merits of the application. OSHA's letter also included a set of proposed conditions for the grant of an interim order and permanent variance and a request for NSCI's comments on these proposed conditions. On July 10, 2015, NSCI provided its response (Ex. OSHA-2014-0022-0010) indicating acceptance of the proposed conditions and including a few recommended changes. OSHA carefully reviewed NSCI's recommended changes and incorporated the majority of the changes into the conditions of the variance.

Following this review, OSHA determined that the applicant proposed an alternative that provides a workplace as safe and healthful as that provided by the standard. On

December 2, 2015, OSHA published a preliminary Federal Register announcing NSCI's application for a permanent variance and interim order, grant of an interim order, and request for comments (80 FR 75472).

The comment period closed on January 4, 2016, and OSHA received one comment (Ex. OSHA-2014-0022-0012) from the Association for Packaging and Processing Technologies in support of granting NSCI the variance.

## **II. The Variance Application**

### A. Background

NSCI's variance application and the responses to OSHA's follow-up questions included the following: detailed descriptions of the manufacturing process; the equipment used; the proposed alternative to lockout/tagout (LOTO) devices and procedures implemented during servicing and maintenance of specific equipment (e.g., grinding of roll mill passes located in the roll mill stands); and technical evidence supporting NSCI's assertions of equivalency of worker protection.

According to the information included in its application, performing lockout on the roll mill stands requires access to the MCR, an area restricted to qualified electricians. Because NSCI employees who perform the particular task of grinding the passes are not qualified electrical employees trained in recognition and mitigation of electrical hazards, they may not access the MCR. Therefore, they cannot use the EID in that location to isolate the hazardous electrical energy or personally verify that energy isolation has been achieved if the EID is operated by a qualified employee.

To address these issues, NSCI developed an alternative method of preventing the unexpected startup or energization of the roll mill passes located in the roll mill stands.

NSCI proposes to use a comprehensive engineered system and appropriate administrative procedures to meet the energy isolation requirements. The engineered system uses a “trapped key” concept and monitored safety-rated power relays in combination with administrative procedures. The trapped key system is designed to: replace a locked out energy isolating device; and function similarly (to a lockout device), in that only the employee in possession of the key can restart the machine undergoing maintenance. The single key is controlled through administrative group lockout procedures that NSCI believes match the requirements of 29 CFR 1910.147.

Further, NSCI asserted that its proposed trapped key energy control system has been evaluated<sup>1</sup> for three scenarios that could result in unexpected energization of the rolls including: (1) intentional de-energization; (2) intentional re-energization; and (3) potential faults. The system prevents unexpected startup or energization in all three scenarios.

The applicant contended that the alternative safety measures included in its application provide its workers with a place of employment that is at least as safe and healthful as they would obtain under the existing provisions of OSHA’s control of hazardous energy (lockout/tagout) standard. The applicant certified that it provided employee representatives with a copy of the variance application. The applicant also certified that it notified its workers of the variance application by posting, at prominent

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<sup>1</sup>NSCI provided documentation that TUV Rheinland, an independent third-party testing laboratory reviewed and certified that the trapped key interlock system is a suitable component for use in safety category 2, 3, and 4 safety systems as specified in International Electrotechnical Commission (IEC) and International Organization for Standardization (ISO) machinery standards. Further, NSCI asserted that several independent experts (including Dr. James Barrett, Mr. Ed Grund, Mr. Bruce Main, and Mr. Alan Metelsky) skilled in the evaluation of electrical circuitry, guarding, and the control of hazardous energy evaluated the circuitry of the trapped key system and found that it was appropriately designed and installed for this application.

locations where it normally posts workplace notices, a summary of the application and information specifying where the workers can examine a copy of the application. In addition, the applicant informed its workers of their rights to petition the Assistant Secretary of Labor for Occupational Safety and Health for a hearing on the variance application.

B. Variance from Paragraph (d)(4)(i) and (d)(4)(ii) of 29 CFR 1910.147

As an alternative means of compliance to the requirements of 1910.147(d)(4)(i) and (ii), NSCI proposed to use a comprehensive engineered system and appropriate administrative procedures to meet these requirements. The engineered system uses a “trapped key” concept and monitored safety-rated power relays in combination with administrative procedures. The trapped key system is designed to: replace a locked out energy isolating device; and function similarly (to a lockout device), in that only the employee in possession of the key can restart the machine undergoing maintenance. The single key is controlled through administrative group lockout procedures identical to those required by 29 CFR 1910.147. Although the trapped key prevents normal intended startup of the equipment being serviced, it is not being used on an EID, as required by OSHA’s standards. To meet this requirement, NSCI proposed to use a monitored safety-relay system that uses approved components, redundant systems, and control-reliable circuitry. Use of the trapped key system in combination with detailed administrative energy control policies and procedures, as well as providing effective training allows NSCI’s authorized and affected employees to complete the required grinding of its stationary rolls in a manner that provides equivalency in energy isolation to compliance with the applicable provisions of the LOTO standard. The trapped key system is based

on use of an Allen Bradley GuardMaster safety-rated relay, which is specifically designed for safety applications. However, the use of the Allen Bradley GuardMaster safety-rated relay does not meet the LOTO standard's definition of EID because this relay is a form of control circuitry.

The applicant maintains that use of the trapped key system provides equivalent safety with what can be achieved by strict compliance with the 1910.147(d)(4)(i) and (ii) requirements. According to NSCI's variance application, equivalent safety is achieved by prohibiting roll movement during de-energization while grinding is being performed, as well as prohibiting mistaken intentional re-energization and re-energization due to fault conditions, without exposing employees to hazards within the MCR. To protect against system faults causing re-energization, the trapped key system meets the requirements for control reliability as stated in ANSI B11.19 (2010) Performance of Safeguarding, in that no single fault results in the loss of the safety function. In addition, the system includes system fault monitoring, tamper resistance, and exclusive employee control over lockout devices.

Further, the applicant asserted that the trapped key system uses well tried components, which is a key factor in the reliability of a control system. The system is based on an Allen Bradley GuardMaster safety-rated relay which is specifically designed for safety applications. The trapped key is a specially manufactured unique key that is only available from the manufacturer at a significant cost, and cannot be otherwise duplicated.

### C. Technical Review

OSHA conducted a review of NSCI's application and the supporting technical documentation. After completing the review of the application and supporting documentation, OSHA concluded that NSCI:

1. Modified the electrical controls at the pulpit (central control station located on the roll mill floor for the 15 roll mill stands), to prevent employee exposure to hazards associated with movement of the roll mill while performing the task of grinding roll mill passes located in the roll mill stands;
2. Installed a trapped key control system and implemented administrative energy control procedures that prevent employee exposure to hazards associated with energy while grinding on the roll mill passes;
3. Utilizing qualified engineering safety experts, performed a job hazard analysis for roll grinding associated tasks, conducted and documented an electrical isolation analysis, system and functional safety reviews, and control reliability analysis to verify that the use of the trapped key system and administrative energy control procedures prevent the movement of roll mill passes; prevent mistaken or intentional re-energization; and maintain immobility in the event of fault conditions;
4. Developed a two-tiered system of securing the trapped key as follows:
  - a. Stopping the operation and energization of the roll mill passes by removing the trapped key from the system, and securing the key within a lock box inside the pulpit area (central control station located on the roll mill floor for the 15 roll mill stands); and

- b. Locking the key to the lock box in the pulpit area inside a secondary group lock box installed on the roll mill floor, with each employee performing roll mill grinding applying their personal lock to the lock box;
- 5. Developed detailed administrative energy control procedures for use of the trapped key system;
- 6. Implemented detailed administrative energy control procedures designed to ensure that each authorized employee applies a personal lock to the secondary group lock box;
- 7. Procured and provided appropriate equipment and supplies;
- 8. Made the administrative energy control policies and procedures available in English and Spanish;
- 9. Trained authorized and affected employees on the application of the trapped key system and associated administrative energy control policies and procedures;
- 10. Ensured that grinding on the passes is conducted only while using the administrative energy control procedures based on the trapped key system;
- 11. Installed guarding on the entry/infeed and exit/outfeed sides of each roll mill stand to prevent employees from standing between turning mills and being exposed to the crushing hazards of in-running nip points;
- 12. Developed additional administrative controls and procedures to minimize the potential for authorized and affected employees to enter between the mill stands when harm could occur; and
- 13. Designated and posted the areas as “No Entry” unless the procedures (1-12 above) are followed.

### **III. Description of the Conditions Specified for the Permanent Variance**

As previously indicated in this notice, OSHA conducted a review of NSCI's application and the supporting technical documentation. After completing the review of the application and supporting documentation, OSHA determined that NSCI developed, and proposed to implement, effective alternative means of protection that protect its employees as effectively as paragraphs 1910.147(d)(4)(i) and (ii) of OSHA's LOTO standard during the servicing and maintenance task of grinding roll mill passes located in the roll mill stands. Therefore, on December 2, 2015, OSHA published a preliminary Federal Register announcing NSCI's application for a permanent variance and interim order, grant of an interim order, and request for comments (80 FR 75472). The comment period closed on January 4, 2016, and OSHA received one comment (Ex. OSHA-2014-0022-0012) from the Association for Packaging and Processing Technologies in support of granting NSCI the variance.

During the period starting with the December 2, 2015, publication of the preliminary Federal Register notice announcing grant of the interim order (80 FR 75472), until the Agency modifies or revokes the interim order or makes a decision on its application for a permanent variance, the applicant was required to comply fully with the conditions of the interim order as an alternative to complying with the requirements of 29 CFR 1910.147(d)(4)(i) and 1910.147(d)(4)(ii). With the publication of this notice, OSHA is revoking the interim order granted to the employer on December 2, 2015 (80 FR 75472).

This section describes the conditions that comprise the alternative means of compliance with 29 CFR 1910.147(d)(4)(i) and (d)(4)(ii). Also, these conditions provide

additional detail regarding the conditions that form the basis of the permanent variance OSHA is granting to NSCI.

#### Condition A: Scope

The scope of the permanent variance limits coverage of the conditions of the permanent variance to the work situations specified under this condition. Clearly defining the scope of the permanent variance provides NSCI, NSCI's employees, other stakeholders, the public, and OSHA with necessary information regarding the work situations in which the permanent variance applies and does not apply. For example, condition A limits coverage of the permanent variance only to the task of grinding roll mill passes located in the roll mill stands. The condition clarifies that no other maintenance work, including electrical maintenance, can be performed on the roll mill passes, the roll mill motors, other residual or stored energy sources, or electric circuits connected to the trapped key system or roll mill stands using the trapped key system to control hazardous energy.

According to 29 CFR 1905.11, an employer or class or group of employers<sup>2</sup> may request a permanent variance for a specific workplace or workplaces. If granted, the variance applies only to the specific employer(s) that submitted the application. In this instance, the permanent variance applies to NSCI at its Wallingford, CT plant only. As a result, it is important to understand that permanent variance does not apply to any other employers or NSCI plant locations.

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<sup>2</sup>A class or group of employers (such as members of a trade alliance or association) may apply jointly for a variance provided an authorized representative for each employer signs the application and the application identifies each employer's affected facilities.

### Condition B: Definitions

Condition B defines a series of terms, mostly technical terms, used in the permanent variance to standardize and clarify their meaning. Defining these terms serves to enhance the applicant's and its employees' understanding of the conditions specified by the permanent variance.

### Condition C: Safety and Health Practices

Condition C requires the applicant to: (1) modify certain controls at the pulpit by installing and operating a trapped key system designed to replace an energy isolating device; (2) develop and implement certain trapped key system-related alternate energy control policies and procedures; and (3) develop and implement a series of trapped key system-related hazard prevention and control requirements and methods designed to ensure the continued effective functioning of the alternate energy control equipment, policies, and procedures. Examples of such hazard control measures include, but are not limited to: (1) conducting grinding on the passes only after using the steps required to properly de-energize the system; (2) under the direction of a qualified person,<sup>3</sup> ensuring that the trapped key system is installed, inspected, serviced, maintained, used, and when appropriate modified in accordance with good engineering practices, and/or in strict accordance with the manufacturers' specifications and instructions, where available; and (3) no other maintenance can be performed on the roll mill stands while grinding is taking place.

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<sup>3</sup>See footnote 9.

#### Condition D: Steps Required to De-energize the System

Condition D requires the applicant to develop and implement a detailed procedure for de-energizing the roll mill passes located in the roll mill stands in order to perform the grinding task. The procedure for de-energizing the roll mill passes includes a series of steps to ensure that all authorized and effected employees are notified that: the roll mill passes are effectively de-energized; the task of grinding the roll mill passes is ready to begin; and no other servicing or maintenance is to be performed on the roll mill stands while grinding is taking place.

#### Condition E: Steps Required to Start Motion Intentionally

Condition E requires the applicant to develop and implement a detailed procedure for re-energizing and intentionally starting motion in the roll mill passes located in the roll mill stands in order to resume normal operations at the conclusion of the grinding task. The procedure for re-energizing the roll mill passes includes a series of steps to ensure that all authorized and effected employees are notified that the task of grinding the roll mill passes is complete and that the roll mill passes are ready for use.

#### Condition F: Training and Methods of Operation

Condition F requires the applicant to develop and implement an effective hazardous energy control qualification and training program for authorized employees involved in using the trapped key system while grinding roll mill passes. The condition specifies the factors that an employee must know following completion of the training program. Elements to be included in the training program encompass, among others: the program to be presented in language that the employees can understand; the instruction be reviewed periodically to accommodate changes in the energy control program; the

contents and conditions included in the variance; the preparation of a job hazard analysis (JHA) describing the application of the trapped key system, the identification of associated hazards and safe use of the associated energy control procedures; and instruction regarding the safe use of the associated energy control procedures. Additionally, condition F also requires the applicant to train each affected employee in the purpose and use of the alternative energy control procedures using the trapped key system.

#### Condition G: Inspections, Tests, and Accident Prevention

Condition G requires the applicant to develop, implement and operate an effective program for completing inspections, tests, program evaluations, and accident prevention measures for the use of the trapped key system and safe application of the hazardous energy control procedures in the roll mill stands and associated work areas. This condition serves to ensure the safe operation and physical integrity of the equipment and work area. Use of the trapped key system while conducting roll mill grinding operations enhances worker safety by reducing the risk of unexpected energization of the equipment.

This condition also requires the applicant to document tests, inspections, corrective actions and repairs involving the use of the trapped key system, and maintain these documents. Further, this requirement provides the applicant with information needed to schedule tests and inspections to ensure the continued safe operation of the equipment and systems, and to determine that the actions taken to correct defects are appropriate.

#### Condition H: Recordkeeping

Condition H requires the applicant to maintain records of specific factors associated with use of the trapped key system implemented to prevent the unexpected energization

of the equipment while grinding roll mill passes. The information gathered and recorded under this provision, in concert with the information provided under condition I (Notifications, for using the OSHA 301 Incident Report form to investigate and record energy isolation failure-related injuries as defined by 29 CFR 1904.4, 1904.7, 1904.8 through 1904.12), enables the applicant and OSHA to determine the effectiveness of the permanent variance in preventing recordable injuries.<sup>4</sup>

#### Condition I: Notifications

Condition I requires the applicant, within specified periods to: (1) notify OSHA (i.e., Office of Technical Programs and Coordination Activities (OTPCA), and the Bridgeport, CT, Area Office) of any recordable injuries, illnesses, fatalities, work-related in-patient hospitalizations, amputations and all losses of an eye (as defined by 29 CFR 1904.4, and 1904.7 through 1904.12) that occur as a result of complying with the alternative energy control conditions of the variance (e.g., as a result of performing roll mill pass grinding operations) within 8 hours of the incident (or becoming aware of the incident); (2) provide OSHA (i.e., OTPCA and the Bridgeport, CT, Area Office) with a copy of the preliminary incident investigation report (using OSHA 301 form) within 24 hours of the incident (or becoming aware of the incident); (3) provide OSHA (i.e., OTPCA and the Bridgeport, CT, Area Office) with a copy of the full incident investigation within 7 calendar days of the incident (or becoming aware of the incident); (4) include on the 301 form information on the energy isolation procedures and conditions associated with the

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<sup>4</sup>See 29 CFR 1904 Recording and Reporting Occupational Injuries and Illnesses ([http://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=STANDARDS&p\\_id=9631](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9631)); recordkeeping forms and instructions (<http://www.osha.gov/recordkeeping/RKform300pkg-fillable-enabled.pdf>); and Updates to OSHA's Recordkeeping Rule (<http://www.osha.gov/recordkeeping2014/index.html>).

recordable injury or illness, the root-cause determination, and preventive and corrective actions identified and implemented; (5) provide its certification that it informed affected workers of the incident and the results of the incident investigation; (6) notify OTPCA and the Bridgeport, CT, Area Office within 15 working days should the applicant need to revise its energy isolation procedures to accommodate changes in the application of its trapped key system that affect its ability to comply with the conditions of the permanent variance; and (7) provide OTPCA and the Bridgeport, CT, Area Office, by January 31<sup>st</sup> at the beginning of each calendar year, with a report covering the year just ended, evaluating the effectiveness of the alternate energy isolation program.

This condition for completing and submitting the variance conditions-related (recordable) preliminary incident investigation report (OSHA 301 form) is more restrictive than the current recordkeeping requirement of completing the OSHA 301 form within 7 calendar days of the incident (1904.29(b)(3)). Submittal of the preliminary incident investigation report is to be followed by submittal of the full incident investigation report within 7 calendar days. This modified and more stringent incident investigation and reporting requirement is restricted to variance conditions-related (recordable) incidents only. Providing this notification is essential because time is a critical element in OSHA's ability to determine the continued effectiveness of the variance conditions in preventing recordable incidents as well as the employer's identification of appropriate hazard control measures and implementation of corrective and preventive actions. Further, these notification requirements enable the applicant, its employees, and OSHA to determine the effectiveness of the permanent variance in providing the requisite level of safety to the employer's workers and, based on this

determination, whether to revise or revoke the conditions of the permanent variance. Timely notification permits OSHA to take whatever action is necessary and appropriate to prevent further variance conditions-related recordable injuries and illnesses. Providing notification to employees informs them of the precautions taken by the employer to prevent similar incidents in the future. Additionally, these notification requirements allow OSHA to: communicate effectively, expedite administration, and enforce the conditions of the permanent variance.

Additionally, this condition requires the applicant to notify OSHA if it ceases to do business, has a new address or location for its main office, or transfers the operations covered by the permanent variance to a successor company. In addition, the condition specifies that OSHA must approve the transfer of the permanent variance to a successor company. These requirements allow OSHA to communicate effectively with the applicant regarding the status of the permanent variance, and expedite the Agency's administration and enforcement. Stipulating that an applicant is required to have OSHA's approval to transfer a variance to a successor company provides assurance that the successor company has knowledge of, and will comply with, the conditions specified by the permanent variance. Also, seeking OSHA's approval to transfer a variance to a successor company serves to further ensure the safety of workers involved in performing the operations covered by the variance.

#### **IV. Decision**

As described earlier in this notice, after reviewing the proposed alternatives OSHA determined that NSCI developed, and proposed to implement, effective alternative means of protection that protect its employees as effectively as paragraphs 1910.147(d)(4)(i) and

(ii) of OSHA's LOTO standard during the servicing and maintenance task of grinding roll mill passes located in the roll mill stands. Further, under section 6(d) of the Occupational Safety and Health Act of 1970 (29 U.S.C. 655(d)), and based on the record discussed above, the Agency finds that when the employer complies with the conditions of the variance, the working conditions of the employers' workers are at least as safe and healthful as if the employers complied with the working conditions specified by paragraph 1910.147(d)(4)(i) and (ii) of OSHA's LOTO standard. Therefore, under the terms of this variance NSCI must: (1) comply with the conditions listed below under section V of this notice ("Order") for the period between the date of this notice and until the Agency modifies or revokes this final order in accordance with 29 CFR 1905.13; (2) comply fully with all other applicable provisions of 29 CFR part 1910; and (3) provide a copy of this Federal Register notice to all employees affected by the conditions using the same means it used to inform these employees of its application for a permanent variance.

## **V. Order**

As of the effective date of this final order, OSHA is revoking the interim order granted to the employer on December 2, 2015 (80 FR 75472).

OSHA issues this final order authorizing Nucor Steel Connecticut Incorporated ("NSCI" or "the applicant") to comply with the following conditions instead of complying with the requirements of paragraphs 29 CFR 1910.147(d)(4)(i) and (ii) of OSHA's LOTO standard during the servicing and maintenance task of grinding roll mill passes located in the roll mill stands. This final order applies to all NSCI employees located at the 35 Toelles Road, Wallingford, CT 06492 establishment during the

servicing and maintenance task of grinding roll mill passes located in the roll mill stands. These conditions are:<sup>5</sup>

A. Scope

1. This permanent variance applies only to the task of grinding roll mill passes located in the roll mill stands of NSCI's Wallingford, CT establishment. This work is to be performed by authorized employees under alternative energy control procedures using a trapped key system and lock boxes.

2. No other maintenance work, including electrical maintenance (such as troubleshooting or maintenance covered under 29 CFR 1910.333), may be performed on the roll mill passes, the roll mill motors, or electric circuits connected to the trapped key system or roll mill stands using the trapped key system to control hazardous energy.

3. If any other maintenance or servicing work is performed, even if that work is performed at the same time as grinding roll mill passes, all of the maintenance work at that time must be performed under full lockout as required by 29 CFR 1910.147.

4. Except for the requirements specified by 29 CFR 1910.147(d)(4)(i) and (ii), NSCI must comply fully with all other applicable provisions of 29 CFR 1910.147 during servicing and maintenance of roll mills during the task of grinding roll mill passes.

5. The interim order granted to the employer on December 2, 2015 (80 FR 75472) is hereby revoked.

B. Definitions

The following definitions apply to this permanent variance:

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<sup>5</sup>See footnote 2.

1. Affected employee – an employee whose job requires him/her to work in an area in which grinding of roll mill passes located in the roll mill stands is being performed.
2. Authorized employee – an employee who uses the trapped key system in order to perform grinding of roll mill passes located in the roll mill stands. An affected employee becomes an authorized employee when that employee's duties include performing grinding of roll mill passes located in the roll mill stands covered under this section.
3. Competent person – an employee who is capable of identifying existing and predictable hazards in the surroundings associated with grinding of roll mill passes located in the roll mill stands or working conditions that are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.<sup>6</sup>
4. Equipment lock box – a part of the trapped key system consisting of any group lock box designated for and mounted on or near equipment used for securing the equipment lock box key by use of a personal lockout device.
5. Equipment lock box lock and key – a part of the trapped key system consisting of a uniquely identified equipment specific lock (red) and key used to secure the pulpit designated lock box containing and securing the trapped key.
6. Group lock box – a purchased lock box labeled as “TRAPPED KEY SYSTEM” that is used to enable more than one lock to be applied to the box. There are two types of lock boxes used in association with the trapped key system (see definitions for pulpit designated lock box and secondary group lock box).

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<sup>6</sup>Adapted from 29 CFR 1926.32(f).

7. Job Hazard Analysis/Job Safety Analysis – an evaluation of tasks or operations to identify potential hazards and to determine the necessary controls.

8. Personal lock and key – a durable, standardized substantial and uniquely identified device (a lock) that is maintained and controlled by a single authorized employee whose name is attached to the device. The key is unique to this device and is equally maintained and controlled by the authorized employee<sup>7</sup> whose name is attached to the device. The personal lock and key is used to secure the equipment lock box key in the secondary group lock box.

9. Pulpit designated lock box – a group lock box mounted inside the pulpit designated for use with the “TRAPPED KEY SYSTEM” and including the: (a) trapped key; (b) equipment lock box lock and key; and (c) pulpit operator personal lock and key placed on the pulpit designated lock box to secure the trapped key.

10. Pulpit operator – an authorized employee who: (a) is designated to work on a roll mill crew; (b) is authorized to use the trapped key system during the grinding of roll mill passes; and (c) is trained to operate the pulpit panel. The pulpit panel has the ability to control the following equipment systems: reheat furnace, discharge roll line, turntable, roll mill stands A & B; roll mill stands 1 - 15; water system; finishing mill; laying head; and stelmore conveyor.

11. Pulpit operator trapped key system personal lock and key – a part of the trapped key system consisting of a uniquely identified lock (green) and key used by the pulpit operator to secure the pulpit designated lock box containing and securing the trapped key.

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<sup>7</sup>See 29 CFR Part 1910 [Docket No. S-012A], RIN 1218-AA53. Control of Hazardous Energy Sources (Lockout/Tagout), regarding “one person, one lock, one key.”

12. Qualified person – an employee who, by possession of a recognized degree, certificate, or professional standing, or who, by extensive knowledge, training, and experience, successfully demonstrates an ability to solve or resolve problems relating to the subject matter, the work, or the project.<sup>8</sup>

13. Roll mill operator and/or lead – an authorized employee who is designated and trained to operate specific and multiple equipment systems or perform a specific job task that is part of the rolling process, including application of the trapped key system for the grinding of roll mill passes.

14. Secondary group lock box – a group lock box located on the mill floor just below the pulpit where authorized employees apply personal locks and follow trapped key system alternative energy isolation procedures to secure the equipment lock box key.

15. Safety-rated relay – a device specifically designed for safety applications that meets the requirements for control reliability as stated in ANSI B11.19 (2010) Performance of Safeguarding. The term “control reliable” means that no single fault results in the loss of the safety function. In addition, the relay must include monitoring and tamper resistance.

16. Team member – an employee who is trained and authorized to use the trapped key system in order to perform grinding of roll mill passes located in the roll mill stands.

17. Trapped key – a specially manufactured unique key only available from its manufacturer that is inserted into the trapped key system’s rotary switch. The rotary switch trapped key is mechanically attached by a chain to the pulpit designated lock box.

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<sup>8</sup>Adapted from 29 CFR 1926.32(m).

18. Trapped key system – the alternative method of preventing the unexpected startup or energization during grinding of roll mill passes located in the roll mill stands. NSCI presented the trapped key system to OSHA in its variance application of September 22, 2014, as supplemented by its responses to OSHA’s questions during the Agency’s application review. The system is based on an Allen Bradley GuardMaster safety-rated relay which is specifically designed for safety applications and use of a trapped key that is a specially manufactured unique key only available from its manufacturer, and the administrative controls described in this variance.

### C. Safety and Health Practices

1. NSCI shall modify the electrical controls at the pulpit (central control station located on the roll mill floor for the 15 roll mill stands), to prevent employee exposure to hazards associated with movement of the roll mill during the task of grinding roll mill passes;
2. NSCI shall install a trapped key system;
3. NSCI shall install a pulpit designated lock box for the trapped key in the pulpit area;
4. NSCI shall install a secondary group lock box in the roll mills floor area for securing the pulpit designated lock box key;
5. NSCI shall develop administrative energy control procedures for use of the trapped key system as described below;
6. NSCI shall implement detailed energy control procedures designed to ensure that each authorized employee applies a personal lock to the secondary group lock box, and has the ability to personally verify de-energization of the system, as described below;

7. NSCI shall make the energy control policies and procedures available to authorized and affected employees in English and Spanish;

8. NSCI shall ensure that grinding on the passes is conducted only while using the administrative energy control procedures based on the trapped key system, or using full lockout procedures that comply with 29 CFR 1910.147 when the roll stands must be de-energized so that other maintenance operations can be performed simultaneously with roll grinding;

9. NSCI shall install guarding on the entry/infeed and exit/outfeed sides of each roll mill stand to prevent employees from standing between turning mills and being exposed to the crushing hazards of in-running nip points;

10. NSCI shall develop additional administrative controls and procedures to minimize the potential for authorized and affected employees to enter between the mill stands when harm could occur; and

11. NSCI shall designate and post the areas as “No Entry” unless the procedures (1-10) are followed.

12. NSCI shall ensure that the trapped key system and its components are properly installed, inspected, maintained, and used so that it works as designed. NSCI shall strictly follow, where applicable, manufacturers’ recommendations for the installation, inspection, maintenance, and use of the system and its components.

13. NSCI shall ensure that the trapped key system is only altered or modified for uses specified and approved by a qualified person by following good engineering practices. Where available, such alterations and modifications shall strictly follow the manufacturers’ specifications, instructions, and written authorization. No changes or

modifications may be made to the trapped key system or its components that diminish the protection provided to affected employees.

14. NSCI shall ensure that alteration or modification of the trapped key system is fully justified and documented when the manufacturers' specifications, instructions, and written authorization are lacking.

15. NCSI shall implement a procedure to ensure that no other maintenance will be performed on the roll mill stands while grinding is taking place, unless full lockout is used for all maintenance tasks being performed at that time.

#### D. Steps Required to De-energize the System

NSCI shall develop and implement a detailed procedure for de-energizing the roll mill passes located in the roll mill stands in order to perform the grinding task. The procedure for de-energizing the roll mill passes shall include the following steps:

1. The authorized employee de-energizing the roll mill passes shall notify all affected employees that the equipment will be shut down and locked out to perform grinding of the passes;
2. The pulpit operator shall turn off the control leveler on the control panel;
3. The pulpit operator shall activate the E-stop;
4. The pulpit operator verifies that the red "system functional" indicator is illuminated, then turns the trapped lockout key 90° to OFF position, and removes the trapped key from the panel. The operator verifies that the green "safe to work indicator" illuminates, and that the red "system functional" indicator goes out;
5. The pulpit operator:

- a. Places the trapped key in the pulpit designated lock box and applies his or her personal lock to the pulpit designated lock box; and
  - b. Applies the equipment lock box lock designated for this energy control procedure;
6. The pulpit operator hands the equipment lock box lock key to the roll mill operator and/or lead;
7. The roll mill operator and/or lead takes the equipment lock box lock key to the secondary group lock box;
8. The roll mill operator and/or lead places the equipment lock box lock key in the secondary group lock box and attaches his or her personal lock;
9. Authorized employees (team members) place their personal locks on the secondary group lock box;
10. The roll mill operator and/or lead verifies that the equipment is de-energized and locked out by trying to operate the equipment (using the start button);
11. The roll mill operator and/or lead ensures that there are no additional sources of energy that could lead to the unexpected energization of the roll mill passes;
12. Authorized employees who placed their personal trapped key system locks on the secondary group lockout box shall also confirm that the equipment is fully de-energized;
13. Authorized employees who placed their personal locks on the secondary group lock box shall maintain their personal key in their possession while performing grinding of the roll mill passes; and
14. Authorized employees shall perform the task of grinding the passes only while these procedures are used.

#### E. Steps Required to Start Motion Intentionally

NSCI shall develop and implement a detailed procedure for re-energizing and intentionally starting motion in the roll mill passes located in the roll mill stands in order to resume normal operations at the conclusion of the grinding task. The procedure for re-energizing the roll mill passes shall include the following steps:

1. The roll mill operator and/or lead shall check the equipment and the immediate area around the equipment to ensure that necessary items have been removed and that the equipment components are operationally intact;
2. The roll mill operator and/or lead shall check the work area to ensure that all affected employees have been safely positioned or removed from the area;
3. The roll mill operator and/or lead shall check that all controls are in the neutral or off position;
4. Authorized employees shall remove their personal trapped key system locks from the secondary group lock box;
5. The roll mill operator and/or lead shall remove the equipment lock box lock key from the secondary group lock box and take it to the pulpit;
6. The roll mill operator and/or lead shall hand the equipment lock box lock key to the pulpit operator;
7. The pulpit operator shall verify that all personnel are clear of the equipment before starting to re-energize the roll mill passes;
8. The pulpit operator shall remove his or her trapped key system personal lock from the pulpit designated lock box;

9. Using the equipment lock box lock key, the pulpit operator shall remove the equipment lock box lock;

10. The pulpit operator shall remove the trapped key from the pulpit designated lock box and shall insert the key into the rotary switch and turn it 90° to the ON position;

11. The pulpit operator shall press the reset button to re-energize the roll mill passes;

12. The pulpit operator shall confirm that the green light clears and the red light activates indicating that the system is powered and that the trapped key system no longer prevents roll mill motion; and

13. The pulpit operator shall notify affected employees that the task of grinding the roll mill passes is complete and that the roll mill passes are ready for use.

#### F. Training and Methods of Operation

NSCI shall develop and implement a detailed worker qualifications and training program. NSCI must:

1. Develop an energy control training program and train each authorized employee, pulpit operator, roll mill designated person, and their supervisors on the trapped key system, and the procedures each must perform under it. The training program shall be provided in a language that the employees can understand;

2. Develop a training program and train each affected employee in the purpose and use of the alternative energy control procedures using the trapped key system before commencing operations under this variance, and document this instruction. The training program shall be provided in a language that the employees can understand;

3. Repeat the instruction specified in paragraph (1) of this condition periodically and as necessary (e.g., after making changes, in accordance with condition I-5, to the use of

the trapped key system that affect its component configuration or operation and associated energy control procedures);

4. Ensure that each authorized and affected employee, designated pulpit operator, roll mill designated person, and each of their supervisors have effective and documented training in the contents and conditions covered by this proposed variance;

5. Ensure that only trained and authorized employees, designated pulpit operators, and roll mill designated persons, perform energy control procedures for the task of grinding roll mill passes;

6. Prepare a JHA for the safe application of energy control procedures; and

7. Review periodically and as necessary (e.g., after making changes, in accordance with conditions C-13 and I-5, to the component configuration or operation of the trapped key system and energy control procedures that affect the grinding of roll mill passes located in the roll mill stands), the contents of the JHA with affected personnel.

#### G. Inspections, Tests and Incident Prevention

NSCI shall develop and implement a detailed program for completing inspections, tests, program evaluations and incident prevention. NSCI must:

1. Initiate and maintain a program of frequent and regular inspections of the trapped key system and associated work areas by:

a. Ensuring that a competent person (authorized employee) conducts daily visual checks and quarterly inspections and functionality tests of the trapped key system components and configuration or operation and energy control procedures that affect the grinding of roll mill passes located in the roll mill stands to ensure that the procedure and the conditions of this variance are being followed;

- b. Ensuring that a competent person conducts weekly inspections of the work areas associated with the grinding of roll mill passes located in the roll mill stands; and
  - c. Developing a set of checklists to be used by a competent person in conducting the weekly inspections of the work areas associated with the grinding of roll mill passes located in the roll mill stands and the quarterly inspections and functionality tests of the trapped key system components and configuration or operation and energy control procedures that affect the grinding of roll mill passes.
- 2. Remove the equipment from service if the competent person determines that the equipment constitutes a safety hazard. NSCI must not return the equipment to service until the hazardous condition is corrected and the correction has been approved by a qualified person.
  - 3. All maintenance, servicing, and installation of replacement parts must be performed in strict accordance with good engineering practices. Where available, the maintenance, servicing and installation of replacement parts must strictly follow the manufacturers' specifications, instructions, and limitations.

#### H. Recordkeeping

- 1. NSCI must maintain a record of any recordable injury, illness, in-patient hospitalizations, amputations, loss of an eye or fatality (using the OSHA 301 Incident Report form to investigate and record energy control-related recordable injuries as defined by 29 CFR 1904.4, 1904.7, 1904.8 through 1904.12<sup>9</sup>), resulting from the task of

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<sup>9</sup>See footnote 5.

grinding roll mill passes located in the roll mill stands by completing the OSHA 301 Incident Report form and OSHA 300 Log of Work-Related Injuries and Illnesses.

2. NSCI must maintain records of all tests and inspections of the component configuration or operation, and energy control procedures, as well as associated hazardous condition corrective actions and repairs.

#### I. Notifications

To assist OSHA in administering the conditions specified herein, NSCI shall:

1. Notify the OTPCA and the Bridgeport, CT, Area Office of any recordable injuries, illnesses, in-patient hospitalizations, amputations, loss of an eye or fatality (by submitting the completed OSHA 301 Incident Report form) resulting from implementing the alternative energy control procedures of the proposed variance conditions while completing the task of grinding roll mill passes located in the roll mill stands. The notification must be made within 8 hours of the incident or 8 hours after becoming aware of a recordable injury, illness, in-patient hospitalizations, amputations, loss of an eye, or fatality.

2. Submit a copy of the preliminary incident investigation (OSHA form 301) to the OTPCA and the Bridgeport, CT, Area Office within 24 hours of the incident or 24 hours after becoming aware of a recordable case and submit a copy of the full incident investigation within 7 calendar days of the incident or 7 calendar days after becoming aware of the case. In addition to the information required by the OSHA form 301, the incident-investigation report must include a root-cause determination, and the preventive and corrective actions identified and implemented.

3. Provide certification within 15 working days of the incident that NSCI informed affected workers of the incident and the results of the incident investigation (including the root-cause determination and preventive and corrective actions identified and implemented).

4. Notify the OTPCA and the Bridgeport, CT, Area Office in writing and 15 working days prior to any proposed change in the energy control operations (including changes addressed by condition C-13) that affects NSCI's ability to comply with the conditions specified herein.

5. Obtain OSHA's approval prior to implementing the proposed change in the energy control operations that affects NSCI's ability to comply with the conditions specified herein.

6. Provide a written evaluation report, by January 31<sup>st</sup> at the beginning of each calendar year, with a report covering the year just ended, to the OTPCA and the Bridgeport, CT, Area Office summarizing the quarterly inspections and functionality tests of the trapped key system components and configuration or operation and energy control procedures that affect the grinding of roll mill passes located in the roll mill stands, to ensure that the energy control procedure and the conditions of this variance are being followed.

Note: The evaluation report is to contain summaries of: (1) the number of variance-related incidents (as recorded on OSHA 301 forms); and (2) root causes of any incidents, and preventive and corrective actions identified and implemented.

7. Inform the OTPCA and the Bridgeport, CT, Area Office as soon as possible after it has knowledge that it will:

- a. cease to do business;
  - b. change the location and address of the main office for managing the alternative energy control procedures specified herein; or
  - c. transfer the operations specified herein to a successor company.
8. Notify all affected employees of this permanent variance by the same means required to inform them of its application for a variance.
9. Request approval from OSHA for the transfer of the permanent variance to a successor company.

### **Authority and Signature**

David Michaels, Ph.D., MPH, Assistant Secretary of Labor for Occupational Safety and Health, 200 Constitution Avenue, NW., Washington, DC 20210, authorized the preparation of this notice. Accordingly, the Agency is issuing this notice pursuant to Section 29 U.S.C. 655(6)(d), Secretary of Labor's Order No. 1-2012 (77 FR 3912, Jan. 25, 2012), and 29 CFR 1905.11.

Signed at Washington, DC, on March 4, 2016.

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**David Michaels,**  
Assistant Secretary of Labor for Occupational Safety and Health.

**BILLING CODE: 4510-26-P**

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